

SAFE PACKAGING FOR HEALTH FOOD PRODUCTS

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ABSTRACT

Packaging industries should be considering technology that creates a balance between food protection with other issues, including material costs, safety, social and environmental consciousness, and strict regulations on pollutants and disposal of municipal solid waste. The current issues in food packaging seem to focus mainly on general matters, while there are numerous safety, health and environmental impact issues that were not highlighted due to economic reasons. The health impact of packaging materials and chemicals are has become more significant as new findings have shown that these chemicals may affect the reproductive system of babies and children and also adults. Some of these chemicals also may cause obesity and exert estrogenic effects on women. Some of these materials release endocrine disrupting chemicals (EDC) into food and may exert several endocrine disruption effects and this may cause various adverse health effects. Some examples of these materials are phthalates, bisphenol A and polybrominated compounds used in packaging materials. Endocrine disrupting chemicals are exogenous chemicals introduced into biological systems that may cause a derailment of the endocrine system causing the organism to have various hormone related health problems. The EDC exerts their effects in minute quantities and they act by receptor-mediated mechanism.

INTRODUCTION

The rapid development in the food processing and food packaging technology worldwide has contributed significantly towards maintaining safety in food supplies. The main aim of having good food packaging is to ensure the food is intact at the time of processing to the time they reach the consumers or till they are consumed. Packaging industries must also at the same time considers the maintenance of good balance between food quality protection with other issues of concern such as the costing of the materials, social and environmental impacts, disposal and pollutant regulations of the packaging materials. The main role of food packaging is to provide protection to the food products, besides to provide the ingredient and nutritional information to the consumers (Coles, 2003). In doing this, it is also important to look into the most cost effective way to ensure that the industries can satisfy the requirement and the desire of the consumers, as well as maintaining the food safety and minimizing the environmental impact.

Common materials used in food packaging includes aluminium, tin-plate, paper, paperboards, plastics and glass. A wide variety of plastics related materials were also available and used for food packaging, as it can be available in various specifications to suite the need of the various types of food materials. There are also multiple materials used in one type of packaging so as to create materials that is more versatile in their usage. These new materials are more resistant and more reliable for packaging purposes, but some of

them are more persistent to degradation and contributes more to the environmental pollution problems. Lately, these new chemicals were also known to contribute to health problems and were known to cause several reproductive problems and also obesity in human. It is no doubt that these new chemicals are also contributing to the new and emerging health problems, which needs immediate attention. One of the most important packaging materials that are known to cause endocrine disrupting effects is plastics and its derivatives.

PLASTICS AND ITS DERIVATIVES

Plastics can be categorized into two categories, the thermoplastics and thermosets. (EPA, 2006). Thermoplastics are polymers that are able to melt or soften when heated, and return to their original condition when they are cooled again. This property has made thermoplastics to be used as containers, bottles, films and thin sheets for packaging as they are also easily recyclable. The thermosets are plastics that solidify and sets irreversibly when heated. They cannot be easily moulded and thus are not much used in food industries. Plastics are usually made from monomers to form polymers, which are usually more robust and more suitable for food packaging. Most of the plastics are more flexible, can be easily moulded and designed for this purpose. Plastics are also less expensive and more resistant to chemicals, besides being lighter and having wide range of physical and chemical properties. For packaging purposes, they are easily sealable, can be printed and can be well suited into most of the processing plants.

HEALTH CONCERNS FROM THE PLASTIC PACKAGING MATERIALS

Health concerns from the plastic packaging materials has emerged since the reports on the estrogenic effects of bisphenol A on animals were published, and then followed by the report on the effects of phthalates as endocrine disruptors were published. Although these results were initially very controversial and disputable, they were then became more acceptable and gained attention by several governments around the world (Welshons, 1977). Studies have shown that bisphenol A can leach out of certain products, including the plastic lining of cans used for food, polycarbonate babies' bottles and tableware (Lyons, 2000). Trace levels of nonylphenol and bisphenol A have been reported in human cord blood and several studies have shown that bisphenol A can be transferred across the placenta barrier of female Fischer 344 rats to their fetuses (Takahashi and Oishi, 2000; Tan and Mustafa, 2001). Despite these safety concerns, the use of plastics in food packaging has continued to increase due to the low cost of materials and functional advantages (such as thermosealability, microwavability, optical properties, and unlimited sizes and shapes) over traditional materials such as glass, papers and tin materials (Lopez-Rubio, 2004).

ENDOCRINE DISRUPTING CHEMICALS IN PACKAGING MATERIALS

Bisphenol A and phthalates are some of the common EDC that are used in various packaging materials. It has been known for many years that bisphenol A is able to mimic the female hormone estrogen but it was not until late 1990s when researchers began to

worry that this may lead to effects at relatively low levels of exposure (Dodds 1936, Morrissey 1987) Much of the concern is focused on the potential effects on the unborn child, because the sex hormones play a crucial role during fetal development. Babies may also be at risk. For example, during the first three months of life, male babies have high levels of male hormones (around 50% of adult levels) (Forest, 1974; Bolton, 1989). Therefore, interference in the hormonal processes of a baby may have significant consequences to their later development. Bisphenol and phthalates may leach from food packaging materials directly into food materials and the migration rate depends highly on the type of food and the storage conditions. Human exposure to bisphenol A (BPA) can arise from a number of sources, particularly from the direct contact of food with polycarbonate materials containing BPA. BPA leaching from polycarbonate material that are used to line food and drink cans has received particular attention. Japanese researchers have found increased levels of BPA leaching from old polycarbonate bottles and tableware used by babies and children. BPA levels increased to 1.8-7.9 µg/kg for older products as compared to 1.0 - 1.9 µg/kg for new products. The leaching of BPA in soup was tested by using new and used polycarbonate soup bowls, and filling them with vegetable soup, water and other liquids at temperature of 60-95 °C, then allowing the liquids to cool for 30 minutes. Both new and old bowls (used up to 6 years) tested with water at 95°C were found to leach between 0.5-2 µg/kg BPA whereas at 85 °C, only older bowls leached BPA (Takao 1999, Lyons 2000).

CONCLUSION

The results from these studies show that infants and children are the groups of individuals also susceptible to ingesting bisphenol A which could arise from packaging materials. This is a worrying factor since individuals at this age are very sensitive to any hormonal changes in the body. The choice of packaging materials used for packing children and infant foods should be given special consideration and a better choice of materials should be imposed.

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INTRODUCTION

For more than 20 years Novus Nutraceuticals has been involved in the research and development of botanical and nutritional products to improve health and wellness of every family. Novus has gone through a long journey of botanical products discovery and holds a strong heritage in local botanical research which underlines its "biological invent" commitment.

The global botanical and nutritional products market is forecast to reach US\$9.15 billion by the year 2015, spurred by increasing incidence of aging population and consumer awareness about general health and well-being (Global Industry Analysis, Inc. 2011). Health conscious consumers driving the demand for products that aim to promote better health, increase longevity and prevent the onset of chronic diseases. Botanical products play a major role in the healthcare and functional foods market. From a technological and developing nation (World, 2011), the market for botanical products is driven by factors such as: consumer awareness, product availability and consumer product acceptance and regulations.